

Potentiometric Surface Map of the Unconsolidated Aquifers of Hamilton County, Indiana

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Hamilton County, Indiana is located in the central portion of the state. The entire county is situated within the White and West Fork White River Basin. The Potentiometric Surface Map (PSM) of the unconsolidated aquifers of Hamilton County was mapped by contouring the elevations of over 1800 static water-levels reported on well records received primarily over a 50 year period. These wells are completed in unconsolidated aquifers at various depths, and typically, under confined conditions (bounded by impermeable layers above and below the water bearing formation). However, some wells were completed under unconfined (not bounded by impermeable layers) settings. The potentiometric surface is a measure of the pressure on water in a water bearing formation. Water in an unconfined aquifer is at atmospheric pressure and will not rise in a well above the top of the water bearing formation, in contrast to water in a confined aquifer which is under hydrostatic pressure and will rise in a well above the top of the water bearing formation.

Static water-level measurements in individual wells used to construct county PSM's are indicative of the water-level at the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement, and pumpage. Therefore, current site specific conditions may differ due to local or seasonal variations in measured static water levels. Because fluctuations in groundwater are typically small, static water-levels can be used to construct a generalized PSM. Groundwater flow is naturally from areas of recharge toward areas of discharge. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams. The contour type was determined based on the amount of data and the degree of change in water levels between wells in each mapped area. In Hamilton County well depths 100 feet or less were a priority in mapping the potentiometric surface.

Universal Transverse Mercator (UTM) coordinates for the water wells were either physically obtained in the field, determined through address geocoding, or reported on water well records; however, the location of the majority of the water well records used to make the PSM were address geocoded. Elevation data were either obtained from topographic maps or a digital elevation model. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

Unconsolidated potentiometric surface elevations in Hamilton County range from a high of 940 feet mean sea level (msl) in the northwest region of the county, to a low of 720 feet msl in the south-central portion. Groundwater flow direction within the White and West Fork White River Basin is generally towards the White River. In the far western portion of the county groundwater flows west towards Eagle Creek in Boone County. Also, in the southeast corner groundwater flows towards Fall Creek. Some of the shallower aquifers associated with other major tributaries

to White River like Stone Creek, Mud Creek and Cicero Creek locally affect the regional drainage with groundwater flowing toward these streams in places. However, the local affect of Cicero Creek in and near Morse Reservoir is significantly reduced by the close proximity to the White River and its associated outwash aquifer. This is indicated by the many wells around the reservoir that are finished in the deeper aquifer with static water levels 10 to 15 feet below the Morse Reservoir normal pool elevation (810 feet msl).

The county PSM can be used to define the regional groundwater flow path and to identify significant areas of groundwater recharge and discharge. County PSM's represent overall regional characteristics and are not intended to be a substitute for site-specific studies.